

**Exhibit For  
Carteret, New Jersey Earth Station  
Call Sign: E950372**

**Compliance with FCC Report & Order (FCC96-377) for the 13.75 - 14.0 GHz Band  
Analysis and Calculations**

**1. Background**

This Exhibit is presented to demonstrate the extent to which the All Mobile Video satellite earth station in Carteret, New Jersey is in compliance with FCC REPORT & ORDER 96-377. This analysis considers a proposed 8.1 meter antenna. The potential interference from the earth station to US Navy shipboard radiolocation operations (RADAR) and the NASA space research activities in the 13.75 - 14.0 GHz Band is addressed in this exhibit. The parameters for the earth station are:

**Table 1. Earth Station Characteristics**

- Coordinates (NAD83): 40° 34' 51.5" N, 74° 12' 58.5" W
- Satellite Location for Earth Station: 15.0° W  
Telstar 12
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: Linear and Circular
- Emissions: 36M0G1W
- Modulation: Digital
- Maximum Aggregate Uplink EIRP: 85.0 dBW for the 36 MHz Carriers
- Transmit Antenna Characteristics
  - Antenna Size: 8.1 meters in Diameter
  - Antenna Type/Model: Comsat/RSI
  - Gain: 59.7 dBi
- RF power into Antenna Flange: 36 MHz  
25.3 dBW  
or -14.2 dBW/4 kHz (Maximum)
- Minimum Elevation Angles:  
Carteret, NJ. 14.5° @ 111.2° Az. (Telstar 12) at 15.0° W
- Side Lobe Antenna Gain: 32 - 25\*log( $\theta$ )

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth station and both Navy Department and NASA systems. Potential interference from the earth station could impact with the Navy and/or NASA systems in two areas. These areas are noted in FCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and radio navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

- 1) Potential Impact to Government Radiolocation (Shipboard Radar)
- 2) Potential Impact to NASA Data Relay Satellite Systems (TDRSS)

**2. Potential Impact to Government Radiolocation (Shipboard Radar)**

Radiolocation operations (RADAR) may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going United States Navy ships. The Federal Communication Commission (FCC) order 96-377 allocates the top 250 MHz of this 600 MHz band to the Fixed Satellite Service (FSS) on a co-primary basis with the radiolocation operations and provides for an interference protection level of -167 dBW/m<sup>2</sup>/4 kHz.

The closest distance to the shoreline from the Carteret earth station is approximately 9.0 km Southeast toward the Atlantic Ocean. The calculation of the power spectral density at this distance is given by:

36 MHz

- |                              |                       |
|------------------------------|-----------------------|
| 1. Clear Sky EIRP:           | 85.0 dBW              |
| 2. Carrier Bandwidth:        | 36 MHz                |
| 3. PD at antenna input:      | -14.2                 |
| dBW/4 kHz                    |                       |
| 4. Transmit Antenna Gain:    | 59.7 dBi              |
| 5. Antenna Gain Horizon:     | FCC Reference Pattern |
| 6. Antenna Elevation Angle : | 14.5°                 |

The earth station will radiate interference toward the Atlantic Ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gains of -1.5 dBi toward the Atlantic Ocean.

The signal density at the shoreline, through free space is:

36 MHz Carriers

PF<sub>D</sub> = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m<sup>2</sup>).

$$\begin{aligned}
&= -14.2 \text{ dBW/4 kHz} + (-1.5) \text{ dBi} - 10 \cdot \log[4\pi \cdot (9000\text{m})^2] \\
&= -105.7 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 52.1 \text{ dB}) \\
&= -157.8 \text{ dBW/m}^2/4 \text{ kHz}
\end{aligned}$$

Our calculations show additional path loss of approximately 52.1 dB including absorption loss and earth diffraction loss for the actual path profiles from the proposed earth station to the nearest shoreline. When adding local close-in building blockage at the Teleport where the 8.1 meter earth station will be located, path profiles show a total pathloss of 115.4 dB

The calculated PFD including additional local path losses to the closest shoreline location is  $-221.1 \text{ dBW/m}^2/4 \text{ kHz}$  for the 36 MHz carriers. This PFD is 54 dB below the  $-167 \text{ dBW/m}^2/4 \text{ kHz}$  interference criteria of R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the Carteret earth station due to the distance and the terrain blockage between the site and the shore.

### **3. Potential Impact to NASA's Data Relay Satellite System (TDRSS)**

The geographic location of the All Mobile Video earth station in Carteret, New Jersey is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by the All Mobile Video earth station in Carteret, New Jersey.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 8.1 meter earth station antenna will have an EIRP less than 71 dBW/6 MHz for the 36 MHz carriers in this band. The total EIRP for the 36 MHz carrier is 76.9 dBW. The equivalent EIRP per 6 MHz segment will remain at 70.9 dBW/6 MHz for the 36 MHz carriers. Therefore, there will be interference to the TDRSS space-to-space link (Table 1).

#### **4. Coordination Issue Result Summary and Conclusions**

The results of the analysis and calculations performed in this exhibit indicate that compatible operation between the earth station at the Carteret, New Jersey and the US Navy and NASA systems space-to-earth and space-to-space links are possible for the 36 MHz carriers.

**Table 1**

#### **Excluded Frequency Range for Intelsat License LLC Earth Station**

<b>System</b>	<b>Frequency Restriction</b>
TDRSS	13.770-13.780 GHz (see Note 1)

**Note 1:** In order to meet the 71 dBW/6 MHz interference criteria, the earth station's 36 MHz carriers would have to be limited to a maximum total EIRP of 76.9 dBW.

No interference to US Navy RADAR or NASA TDRSS space-to-earth operations from the Carteret, New Jersey earth station will occur.



